

MR3065-19

Serial Number: 10/642,245

Reply to Office Action dated 28 November 2007

REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Office Action dated 28 November 2007. Responsive to the rejections made in the Office Action, Claims 14-19 and 21-25 have been amended to clarify the combination of elements that form the invention of the subject Patent Application.

In the Office Action, the Examiner rejected Claims 14-25 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner stated that the term "the electrogram" lacks antecedent basis and suggested the use of the term "an electrogram." The Examiner also stated that the term "of at one beat" should be "of at least one beat," that the term "of at least one sub-segment of at least one beat" should be "of the at least one sub-segment of the at least one beat," and that in Claims 15-19 and Claims 21-25 the term "where" should be "wherein" such that the elements are positively recited in the Claims. Accordingly, Claims 14-19 and 21-25 have been amended to correct the language thereof, thereby, obviating the Examiner's formal concerns under 35 U.S.C. § 112, second paragraph.

The Examiner has rejected Claims 14-17 and 23 under 35 U.S.C. § 102(b) as being anticipated by Stadler, et al. (U.S. Patent 6,128,526). Additionally, the Examiner rejected Claims 18, 19, and 22 under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over

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Stadler, et al. Finally, the Examiner rejected Claims 20, 21, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Stadler, et al.

Before discussing the references relied upon by the Examiner, it is believed beneficial to initially and briefly review some of the features of the subject invention as more clearly defined by the newly-amended independent Claim 14. The invention of the subject Patent Application is directed to a system for the detection of cardiac events. The system includes an electrical circuitry means for determining the time of occurrence of the R-waves of successive beats within the electrogram. The system also contains a processor means for calculating the time period between successive R-waves such that the time period between successive R-waves is defined as an R-R interval. The processor means also calculates the R-R interval for a specific beat within the electrogram being the difference in time of occurrence of the R-wave of a first beat to the time of occurrence of the R-wave of the preceding beat.

Additionally, the system includes a means for determining the signal amplitude of at least one sub-segment of at least one beat of the electrogram wherein the sub-segment has a start time and a time duration. The system also includes a means for adjusting the start time of the sub-segment responsive to the calculated R-R interval based upon a look-up table having predetermined start times associated with specific R-R intervals. Finally, the system includes a processing means for detecting and displaying that the cardiac event has occurred

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by further analysis of the signal amplitude of the at least one sub-segment of the at least one beat of the electrogram.

The concept of adjusting the start time of the sub-segment responsive to the calculated R-R interval based upon a look-up table having predetermined start times associated with specific R-R intervals is clearly seen in the Specification as filed. As paragraph [0049] states:

[a]n important aspect of the present invention is the capability to adjust the location and time and duration of the ST and PQ segments used for the calculation of the ST shifts

It is preferable in all cases to base these times on the R-R interval from the beat before the current beat. As calculating the square root is a processor intensive calculation, the preferred implementation of this feature is best done by pre-calculating the values for the start of the PQ and ST segments during programming and loading these times into a simple look-up table where for each R-R interval, the start times and/or durations for the segments are stored.

In this manner, the present invention provides the distinct advantage of allowing for the adjustment of the location in time and duration of the ST and PQ segments used for the calculation of ST shifts as the patient's heart rate changes throughout the day during various activities. In other words, as the R-R interval shortens, (i.e., an increase in heart rate) the ST and PQ segments would adjust in such a way that they would move closer to the R-wave peak, and therefore become shorter in duration.

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The Examiner has rejected Claims 14-17 and 23 under 35 U.S.C. § 102(b) as being anticipated by Stadler, et al. In contradistinction, the Stadler, et al. reference does not disclose a system wherein the start time of the sub-segment is responsive to the calculated R-R interval based upon a look-up table having predetermined start times associated with specific corresponding R-R intervals. In fact, the Stadler, et al. reference discloses a system wherein three delays, D1, D2, and D3, depend on the current R-R interval. Accordingly, the three delays are adjusted to be proportional or adaptive to the current heart rate. Put another way, the "ST segment measurements are conducted at three locations in the collected and buffered electrogram portion indicated by delays D1, D2 and D3 timed from and following the R peak." (column 19, lines 52-55). Accordingly, the Stadler, et al. reference does not disclose a system wherein the start time of the sub-segment is responsive to the calculated R-R interval based upon a look-up table having predetermined times associated with specific corresponding R-R intervals.

It is respectfully submitted that the Stadler, et al. reference does not provide for a system for the detection of cardiac events wherein the system includes a "means for adjusting the start time of the sub-segment responsive to the calculated R-R interval based upon a look-up table having predetermined start times associated with specific R-R intervals ...", as is necessary to now amended independent Claim 14.

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The Examiner has next rejected Claims 18, 19, and 22 under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Stadler, et al. As Claims 18, 19, and 22 are dependent upon independent Claim 14, Claims 18, 19, and 22 are believed allowable for at least the reasons presented supra.

Finally, the Examiner rejected Claims 20, 21, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Stadler, et al. Again, Claims 20, 21, 24, and 25 are all dependent Claims, which are ultimately dependent upon independent Claim 14, and are all believed to show further patentable distinctions, but are believed allowable for at least the reasons presented supra.

Accordingly, as the Stadler, et al. reference fails to disclose each and every element of the invention of the subject Patent Application, as now claimed, it cannot anticipate that invention. Further, as the reference fails to suggest the combination of elements now claimed, it cannot make obvious that claimed invention either.

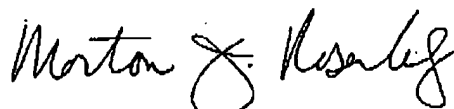
It is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

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Respectfully submitted,
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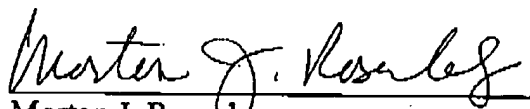
Dated: 28 March 2008

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Morton J. Rosenberg